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ABSTRACT

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WORKING DRAFT

SINGLE PARENTS, WORKING MOTHERS AND THE EDUCATIONAL ACHIEVEMENT OF ELEMENTARY SCHOOL AGE CHILDREN*

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Abstract

Using a nationally representative database of students in grades one through six, this study estimates the effects of number of parents and maternal working on children's school-related achievement. Achievement scores are lower for children from one-parent than from two-parent homes. The effect appears to work primarily through the lower income of one-parent homes and its impact on subsequent variables in the model. The effects of maternal working differ for various subgroups. Children from two-parent homes have lower achievement if the mother works, and the magnitude of the effect is directly related to the amount of time worked. For black children from two-parent homes the direct effect is negative, but the total effect is offset by enhanced family income; no such offsetting, positive effect appears for comparable white children. Black children from one-parent homes have higher achievement if the mother works, mediated to a large extent by increased family income.

Introduction

The research literature has made abundantly clear the relationship of home background variables to children's achievement (e.g., Coleman, Campbell, Hobson, McPartland, Mood, Weinfeld, and York, 1966; Jencks, Smith, Acland, Bane, Cohen, Gintis, Heyns, and Michelson, 1972; White, 1976). Among those home background variables that have been investigated in their relation to achievement are the occupational status and education of one or both parents, family income, race, family structure, and parental work patterns. The purpose of this paper is to present new evidence on the relationship of two of these background variables -- number of parents in the home, and working mothers — to children's achievement.

Over the past decade there have been significant increases in the number of one-parent families, primarily those headed by women, and equally significant increases in the entry of women, particularly mothers, into the labor force. These rapid changes in family structure have raised questions about possible consequences for children's school-related achievement.

Statistics from the Bureau of the Census demonstrate the rapid increase in both the number and proportion of one-parent families in the United States. In 1970, there were 3.5 million one-parent families, and 7.4 million

children under age 18--11.2 percent--living in one-parent homes. By 1980 the numbers had grown to 5.9 million one-parent families with 10.9 million children under age 18--18.9 percent. The statistics for black children are even more impressive; 50.2 percent of black children under age 18 were living with one parent in 1980, up from 33.8 percent in 1970. Moreover, black children spend more of their childhood than white children in one-parent families -- for children born now, 59 percent vs. 31 percent of the years from birth to 18 (Hofferth, 1983). According to one source, "Almost one in two children who are now infants will, before they reach the age of eighteen, live in a one-parent household" (Weiss, 1979:X).

During this time, both married and single mothers have been entering the labor force in ever-increasing numbers. According to the Bureau of Labor Statistics, in 1970, 42 percent of mothers with children under age 18 were in the labor force; by 1980, that figure had grown to 56.6 percent. The percentages are even higher for single mothers with children under age 18--66.4 percent in 1980, up from 60.6 percent in 1970.

Over this same period, there has been a general decline in achievement test scores that has caused much public outcry, with the blame placed indiscriminately on both the home and the school. The most recent expression

of the problem is from the Commission on Excellence in Education (1983), noting that the recent declines in the caliber of students' performance can only be reversed by a concerted effort of schools, citizens and parents. If decreases in achievement scores can be shown to be even partly related to the total absence of a parent in the home or to the "partial" absence of a working mother, the changing family demographics provide legitimate cause for concern.

Literature Review

Single parents. The literature on one-parent families almost exclusively addresses father absence (the most prevalent pattern) relating it to a number of child outcomes, including cognitive performance. The results are inconclusive -- various authors have found deficits related to rearing in a one-parent family (e.g., Blanchard and Biller, 1971; Deutsch, 1960; Lambert and Hart, 1976; Mackie, Maxwell, and Rafferty, 1967; Deutsch and Brown, 1964); others have found no difference (e.g., Hess, Shipment, Brophy, and Bear, 1968; Edwards and Thompson, 1971; Solomon, Hirsch, Scheinfeld, and Jackson, 1972); and a few have found significant advantages for children from one-parent families (Jones, 1975; Oshman, 1975; Wilson, 1967).

The results are sufficiently inconsistent to have led authors of major reviews to form opposite conclusions. Herzog and Sudia (1973:214), reviewing studies published before 1969, on the whole argue for a finding of "no difference" in school achievement between father-present and father-absent children. Shinn (1978:295), reviewing more recent studies, finds that "a majority...have shown detrimental effects of father absence on children's intellectual performance." Hetherington, Camara, and Featherman (1981), in the most comprehensive and most recent review, find consistent differences in favor of two-parent children in measured aptitude, measured achievement, and grade point average or other teacher-assigned scores. Nevertheless, they conclude that differences in achievement, differences of less than a year, are "too small" to be meaningful.

The inconsistencies in both results and interpretations appear to stem from the fact that various studies have differentially taken into account other background variables that may be correlated with one-parent status. The variables of probable importance relate to parental influences, such as socioeconomic status, and family inputs (e.g., time and financial resources). It is interesting that Herzog and Sudia (1973:157) are willing to conclude "no difference" while conceding that "no study reviewed here has been entirely successful in controlling

for SES," while Shinn (1978), who stresses differences in cognitive performance between two- and one-parent children, appears not to notice that these differences are least apparent in studies that have most adequately controlled for socioeconomic status. Hetherington et al., (1981:27) state quite definitively that "we are unable to establish clear associations between one-parent status and depressed achievement since many studies do not provide adequate controls for socioeconomic status or racial or ethnic backgrounds of students...This failure has plagued even the most recent research in this area (NAESP-I/D/E/A, 1980). Reanalysis of these controversial data (Zakariya, 1982) has found that family income (measured as eligibility for free lunch) and gender were more important correlates of achievement than was the number of parents in the home -- a reversal of the original conclusions.

The importance of income is not surprising. Data from the Bureau of Labor Statistics show that the income of female-headed families is less than half that of dual-headed families. For 1980, the figures were $10,233 and $23,263, respectively. Gender is also implicated as an important variable by Hetherington et al., (1981) who note that negative effects of being raised in a one-parent household appear more often for boys. (They do cite one study of negative effects for girls in father-headed, one-parent homes which hints that it may be loss of the same-sex parent that is important).

Other variables may intervene between number of parents and children's achievement, and may provide the mechanisms whereby number of parents exerts an influence. Potentially important here are inputs of parental time. Such inputs may be either related to or independent of socioeconomic status (see for example, Benson, Medrich, and Buckley, 1980), and may be important influences on children's achievement. Time spent with children--by definition, less available in one-parent homes--and the uses of this time have been shown to be related to achievement (Leibowitz, 1977; Benson, et al., 1980; Clarke-Stewart, 1977). However, few studies have adequately explored the relationships among parental time inputs and children's achievement in single- and two-parent families.

Working mothers. In general, the results of studies of maternal working are nearly as inconsistent as those of one-parents. Results can be positive or negative, depending on the subgroup being studied and other variables taken into account as control or intervening variables. Mercy and Steelman (1982), for example, found negative direct effects but positive indirect effects of mother's work status on IQ. Two major and recent reviews (Hoffman, 1980; Heyns, 1982) differ somewhat in their conclusions. Heyns (1982:238) states quite definitively "with very few exceptions, that on achievement, the

children of working mothers differ very little from the children of non-working mothers." Hoffman (1982), however, finds effects of maternal working to be generally neutral or positive for girls and for lower class boys, but negative for middle class boys. Both agree, as do many others (e.g., Woods, 1972; Heyns, 1978; Cherry and Eaton, 1977; Kriesberg, 1967) that among poor and black families, having a working mother contributes positively to the achievement of children. Heyns (1982) summarizes the possible contributing factors to positive effects of maternal employment on black children as (1) greater employability of black mothers than of other family members; (2) greater energy, competence and education among employed than unemployed black mothers; (3) greater numbers of adults in the household to contribute to child care; and (4) greater support within the black culture for maternal employment. Hoffman (1982) notes that the critical factor in these lower-income families may be a selection factor; that is, mothers who choose to work rather than remain on welfare may have other correlates (fewer children, more adults per child) that are known to create higher achievement. This argument is consistent with Heyns' second and third points.

Studies of working mothers suffer from many of the same problems encountered in studies of one-parent families, plus others. Socioeconomic status is often not

well controlled. While working mothers may contribute to family income, the fact that they are working at all may reflect low family income. (This possible effect, and/or the lower earning power of women, can be seen in the relatively small contribution made by a second worker in two-adult households. Where only one works, data from the Bureau of Labor Statistics shows that the average income in 1980 was $19,368; where both work, the average was $25,466.) Another problem lies in the lack of adequate definition of what constitutes full-time vs. part-time work among women.

Parental inputs are also important in considering the effects of working mothers on children's achievement. While a mother's employment may contribute to the family's financial well-being, her working removes her from the home for some amount of time. This loss of her time may be a critical variable in children's achievement. Liebowitz (1977) notes that mothers spend four times as much time with children as do fathers, and that this accounts for the greater contribution of maternal education than of paternal education to children's achievement. This latter finding is confirmed by Murnane (1981). As Hoffman (1979) notes, however, there is no compelling evidence that working mothers spend less time in direct interaction with their children than do

nonworking mothers. In a study of preschoolers, Goldberg (1977) found no difference between working and nonworking mothers in the amount of one-to-one mother-child contact. Similarly, studies of time use in families with children of varying ages find that working mothers spend almost as much time caring for children as do nonworking mothers (e.g., Walker and Woods, 1976; Leibowitz, 1977). This may in part reflect a tendency among mothers of young children to work less than full time, or to work intermittently (e.g., O'Donnell, 1980). Others (e.g., Vanek, 1980; Hill and Stafford, 1974) have suggested that working mothers with limited time may sacrifice housework or leisure time rather than child care.

If maternal time spent with a child is really the critical variable, it would seem that mothers' working during school hours would be less detrimental than working during the hours the child is at home. Keidel (1970), however, found no significant difference for these two situations. It has also been assumed that maternal time is most important in the preschool years. Burchinal (1963) tested the effects on cognitive performance of mothers working at different points during the child's life, and found basically no differences after social status of the family had been controlled. However, Coleman, Hoffer, and Kilgore (1981) found that mother's

working before the child was in elementary school negatively affected children's achievement in high school, while working during elementary school did not.

In general, then, a careful review of both bodies of literature demonstrates not only that the results are inconsistent, but that the inconsistencies most likely stem from failure to control for some variables and to test the mediating effects of others. Absent fathers and working mothers, along with other related home-background variables, may have important effects on achievement, but they most likely work in conjunction with or are mediated by these other variables.

The only way to determine these potential effects is to separate the various home background variables and to determine the relative importance of their direct and indirect effects. The present study is an attempt to do just that. We have developed a conceptual model that offers the possibility that number of parents and employment of mothers work through intermediate processes to affect children's achievement.

Conceptual Model

The conceptual model is presented in Figure 1. (The construction of each of the variables is described in Appendix A.) As can be seen from the figure, we have

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Figure 1 about here

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disaggregated the family background variables into three sets. The first set of variables is seen as truly antecedent or exogenous and includes number of parents in the home, as well as critical control variables (race, mother's educational attainment, and students' gender). Our interpretation of the literature suggests that the three dichotomous exogenous variables -- race, number of parents, and gender -- may interact with one another and/or with other variables in the model in their effects on achievement. If this is the case they become candidates for variables to be used to partition the sample into subgroups, and testing the models separately within subgroups becomes appropriate. The decision to proceed in this way can either be based on conceptual reasons (and Hoffman, 1980, argues for analysis within subgroups), on statistical reasons, or both. The analyses in this study are actually conducted on particular subgroups; this is discussed further below.

Maternal worktime is placed next in the model because it is assumed to be directly affected by the exogenous variables (e.g., number of parents in the home), and is

also assumed to directly affect the final set of family background variables. This final set of family background variables (number of children, family income, and parent's educational attainment expectations for their child) is placed internally within the model, for it is assumed that the prior variables work through these to affect children's achievement. This is particularly true of family income and number of children, which can be assumed to be direct consequences of number of parents and maternal employment. (The relationship between maternal work and fertility has been extensively researched. See for example, Freedman, Whelpton, and Campbell, 1959; Hofferth and Moore, 1979.) Family educational attainment expectations for their children are included in this set of variables, given their probable relation to other family background characteristics and to achievement (Kriesberg, 1967; Williams, 1976).

All of these variables are, in turn, likely to have direct and indirect effects on the ways in which parents spend their time and money resources on their children (Leibowitz, 1977; Hill and Stafford, 1973) and the ways in which the children themselves spend time, with or without the impetus and supervision of the parents (Thomas, 1980). Thus, several process variables -- three parental and three child inputs -- are included as the next set of

intervening variables. The parental input variables measure both environment and behavior and include number of books in the home at the child's reading level, home-school involvement measured by attendance at parent/teacher conferences, and direct help with homework. The three child input variables used here include time spent reading, doing homework, and watching TV.

Finally, these variables may be linked directly and indirectly with children's achievement. The parental and child behaviors, such as time spent by the child reading, and the extent to which parents are involved with the school can be assumed to be related directly to achievement (Benson et al., 1980; Leibowitz, 1977).

The outcome measures of achievement are two separate measures -- reading and math subscores on the Comprehensive Test of Basic Skills (CTBS). We have not combined the two scores into an overall achievement measure, as earlier work based on these data (Rosenthal, Simonsick, Baker, and Ginsburg, 1982) has demonstrated that home background variables have different effects on the two subject areas.

Data

The data used in the analyses were collected in the 1976-77 academic year as part of the Sustaining Effects

Study of Title I, undertaken by System Development Corporation (SDC). Achievement data in reading and math were collected from all students in grades one through six in a stratified national sample of 242 public schools. A random sample of students in each school was further studied through a home interview conducted with the parent(s) of 15,579 of these students (see Hoepfner, Wellisch, and Zagorski, 1977, for a description of the sample).

The achievement data were scores on the Comprehensive Test of Basic Skills (CTBS) reading and math tests, converted to vertical-scale scores (VSS) in an attempt to create a linear scale across grade levels and test forms (see Hemenway, Wang, Kenoyer, Hoepfner, Bear, and Smith, 1978:7-62, for a description of the VSS). To allow analysis of all grades simultaneously, we have standardized these VSS scores within grades to a mean of 50 and a standard deviation of 10. Our analyses use the fall achievement scores obtained shortly after the beginning of the school year.

Because of the purposes of the original study, the data on background variables such as income and work patterns are quite complete; in fact, we have the rare advantage of a continuous variable (average hours worked per week over a year's time) for maternal employment. The data on parent and child behaviors, however, are less complete.

Of the total sample of 15,579, some 1,400 children represented a second sample child in a selected household. Only partial data (excluding parental and child behavior data) were collected for these siblings. Thus, these analyses are conducted on a subset of approximately 14,100 children. Taking into account missing data, we end up with a sample of 13,179 students. Each observation was weighted by an appropriate household weight; weights sum to national probabilities of households with children in grades 1-6.

Finally, we note that these are cross-sectional data, and as such do not allow many inferences that could be drawn from longitudinal data. The greatest flaw in this respect is the lack of historical knowledge concerning the length of absence of the missing parent and the extent to which the mother has worked over the child's entire life-span.

Results

As noted above, the literature suggests that the exogenous variables of race, number of parents and gender may interact with one another and/or with other variables in the model, and should be considered as partitioning variables. To test the statistical validity of this conceptual approach, we estimated models with four-way and

all lower-order interaction terms to determine whether interactions add significantly to explanatory power. It was found that race and number of parents contributed significant interactions while gender did not. It was thus decided to analyze four models partitioned by race and by number of parents -- that is, separate models for white two-parent, white one-parent, black two-parent and black one-parent families (races other than white and black were eliminated from all analyses). In Table 1 we present the means of all variables used in the model for each of these four groups. Sample sizes are also given

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Table 1 about here

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in Table 1 for each group. It is worth noting that children from one-parent households comprise 45 percent of the black sample but only 11 percent of the white sample. These proportions accord reasonably well with national figures for the time period in which these data were collected.

We note that the direction of differences in the means is as expected, with some important exceptions. Mean achievement within each racial group is higher for

children from two-parent homes, for both reading and mathematics. Family income is also higher for two-parent than for one-parent families. A perhaps unexpected pattern is that of the average hours worked per week by the mother; while hours worked by white single mothers exceed hours worked by white mothers in two-parent homes, the reverse is true for blacks. (The numbers of working women in each group follows the same pattern.)

Regression Analyses

For purposes of analyzing the effects of number of parents and maternal working on reading and mathematics achievement, we estimate separate recursive models for the four populations of students defined by race and number of parents. The major focus of this analysis is the decomposition of the total effects of number of parents and maternal work on reading and mathematics achievement into those effects which are mediated and those which are not mediated by subsequent variables in the model; that is, indirect and direct effects, respectively.

All parameter estimates in the recursive models described in this paper are ordinary least squares estimates. In obtaining our parameter estimates, we have not taken into account the possibility of measurement error in the independent variables in each equation. The presence of random measurement error tends to produce

smaller parameter estimates than would be obtained if "true scores" were available and therefore, the estimates presented here may underestimate the true relationships (Duncan, 1975; Namboodiri, Carter, and Blalock, 1975). While there are procedures which allow analysts to take into account measurement error (i.e., multiple indicator models with structural relations between latent variables) we have opted to use the simple method employed here for two reasons. First, many of our variables are measured on a nominal scale, and therefore do not meet the assumption of multivariate normality found in most multiple indicator estimation procedures (e.g., LISREL)[1/]. Second, since this study is somewhat exploratory, it was desirable to assess the relevance of each of the variables included in the model rather than a series of latent concepts.

In our discussion of the analysis which follows, we first briefly describe the direct (unmediated) effects of the exogenous and endogenous variables on the intervening variables within the models, and of these exogenous and intervening variables, other than number of parents and maternal working, on reading and mathematics achievement. This enables us to determine whether the direction of these effects generally accords with expectations from the literature, and thus whether the model appears to be reasonable. We then discuss the results of decomposing

the total effects of number of parents and maternal working into direct (unmediated) and indirect effects on reading and mathematics achievement.

Direct effects on endogenous variables. In Table 2, parameter estimates for each of the four recursive models are shown. A close examination of the regression equations corresponding to the intervening variables in the models suggests that the direct effects are generally in the directions expected based on the research literature. Mother's educational attainment, as expected, significantly positively affects the amount of time worked by the mother. These two variables in turn significantly negatively affect the number of children in the family, and positively affect family income; these relationships accord with the results of previous studies. With respect to parental educational expectations for their children, mothers's educational attainment has postive effects in all subgroups; mother's working has positive effects in the one-parent white subsample; and the child being a female has negative effects in the two-parent white sample.

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Table 2 about here

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In looking at the inputs of time or resources provided by parents, we note that number of books in the home at the child's reading level appears to be fairly consistently and positively related to mother's educational attainment, family income, and parent's educational attainment expectations. Other parental inputs are somewhat less consistent across groups, although generally in the directions expected based on the literature. For example, we observe that the frequency with which a parent attends parent-teacher conferences is positively influenced by mother's educational attainment for all four groups, while helping with homework is related to mother's educational attainment in only two groups (both two-parent). Number of children negatively influences the amount of help with homework and the number of parent-teacher conferences attended by parents in three of the four groups; however, the negative effects of mother's working and of gender are much more consistent with respect to attendance at parent-teacher conferences than with respect to helping with homework. It appears that working mothers may be hampered in their ability to attend outside conferences at school, but may be able to find time to help with homework. Parents of boys attend such conferences more often than do parents of girls. The parents educational expectations for their children also have inconsistent effects on parental time inputs.

Children's use of their own time -- doing homework, watching TV, or reading -- is also not consistently related to antecedent variables for all groups nor is it always in the direction expected. For example, in the two-parent white and one-parent white samples, we find that time spent watching TV is negatively related to mother's education and to parental educational expectations, but the relationship to mother's education is positive for the one-parent black sample. The negative effect of mother's education on time spent by children on homework seems surprising. However, as we shall note, time spent on homework is negatively related to achievement, while mother's education is positively related. Thus, we would expect more highly educated mothers to have children who spend less time on homework -- who presumably need to spend less time on homework. On the other hand, we note that boys usually spend less time on homework than do girls, and yet boys' achievement is generally lower than girls. Boys also spend less time reading, and, as reading is positively related to achievement, this finding is consistent.

Direct effects on achievement. We observe that mother's educational attainment has positive direct effects, significant in all except the one-parent black sample, for both reading and math. Student's gender tends

to have large and significant unmediated effects on reading achievement in each of the samples. This is also true for three of the four groups in the mathematics achievement equation. The general consistency of these estimates shows that female, elementary school age students tend to score higher on both reading and mathematics achievement tests than male students when controlling for a number of potential mediating factors.

A variable which has been shown in the past to negatively affect achievement scores is number of children in the family. Our results show that in three of the four samples, number of children has direct (unmediated) negative effects on reading achievement. In the one-parent white sample, we observe a negative but insignificant parameter estimate. However, number of children appears to have an effect on mathematics achievement only for the two-parent white sample. The greater importance of number of children, and of other variables discussed below, for reading achievement may suggest that reading achievement is more a function of the home environment than is mathematics achievement. This finding is consistent with previous results obtained by Rosenthal et al., (1982).

Family income, as measured by the logarithm of income, has positive unmediated effects on reading and mathematics achievment in each of the samples, although the effect on

mathematics achievement is not significant for the one-parent black sample. Parents' educational expectations have significant and positive direct effects on both reading and math achievement.

With respect to parental inputs, number of books in the home at the child's reading level has significant positive affects on reading and mathematics achievement for all groups. However, the frequency with which a parent assists with a student's homework has negative and significant direct effects for three groups in the reading achievement equation, and for three groups in the mathematics achievement equation. This same general pattern is seen in parental attendance at parent-teacher conferences. These negative relationships, and similar ones found for the amount of time spent on homework by a student, may be indicative of the fact that those pupils who are low achievers in reading and mathematics may spend more time and receive more help than those who are high achievers. Thus, these results may suggest that there is a reciprocal relationship which is not tapped by our recursive model.

For the other variables measuring input of the child's time, we find no effects of TV watching on either reading or mathematics achievement. It is not clear from the literature whether there should be such effects for

children this age, and whether they should be positive or negative (e.g., see Hornik, 1981). However, in reviewing the available literature, Hornik also notes that significant relationships (in either direction) between television viewing and achievement tend to disappear when I.Q. and/or social status are controlled, and the latter is controlled in this study. Finally, time spent reading tends to have positive effects on both reading and mathematics achievement, for all but the one-parent black sample.

Decomposition of effects of number of parents and of maternal work. We now turn our attention to the total, direct and indirect effects of number of parents and of maternal working on both reading and mathematics achievement. As number of parents was used as a partitioning variable, we cannot simply focus on the estimate of a single regression coefficient within a sample to assess the effects of this variable. Thus, a different methodological procedure must be used to ascertain the direct effects of number of parents.

To estimate the direct effect of number of parents on reading and math achievement, we calculated the "first difference" for both the reading and mathematics equations with respect to number of parents. We did this within the white and black samples. Thus, we were able to estimate

changes in reading and math achievement which are a direct function of a change in number of parents (that is, not operating through the intervening variables in the model). Provided with this estimate of the direct effect, we then decomposed the total (reduced form) effects into direct and indirect effects for number of parents and maternal work on reading and mathematics achievement.2/

Table 3 presents total, direct and indirect effects for our two major variables, number of parents and maternal working. Effects of number of parents were computed within racial groups; effects for maternal working were computed within separate models defined by race and by number of parents.

The total effects of number of parents on reading and mathematics achievement for white students are 1.33 and 1.28, respectively; both are statistically significant. Thus, on the average, white students from two-parent households score roughly .13 standard deviations above white students from one-parent households on both reading and mathematics achievement. Most of the total effect for number of parents is attributable to the effect mediated by family income: .99 and .92 for reading and mathematics achievement, respectively. The direct effect of number of parents is insignificant.

The total effects for number of parents for black students are 2.28 and 2.02 for reading and mathematics achievement, respectively; this is nearly twice as large as the total effect of number of parents for white students. These total effect estimates show that black students from dual-headed households score about .2

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Table 3 about here

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standard deviations above similar students from single-headed households. Decomposition of these total effects into direct and indirect effects shows that family income is by far the most important mediator of the effect of number of parents on achievement (2.96 and 2.15 for reading and mathematics achievement, respectively). Again, the direct effect is insignificant.

The results obtained by decomposing the total effect of number of parents on students' achievement for both the white and black samples shows that the primary effects of number of parents operates through family income which, in turn, influences a number of other variables in the model which have direct and indirect effects on student's achievement.

For the second variable of interest in this study -- average maternal hours worked -- the estimates of total effects range from about -.03 in white two-parent households to about .06 in one-parent black households. Of greatest interest is the fact that the effects are significant and negative for the two-parent white sample, but significant and positive for the one-parent black sample. While these effects may appear small, the actual effect depends on the number of hours worked by the mothers. Comparing children of nonworking mothers to those whose mothers work full-time, we find that students from white-dual headed households with non-working mothers score about .1 standard deviations above those with mothers who work 40 hours, on the average. A similar comparison for students from single-black households shows that those students with a full-time working mother score about .2 standard deviations higher on the achievement tests than those with a mother who does not work.

The direct effects of maternal work tend to be significant and negative in the two-parent white and two-parent black samples. For the black two-parent students, this negative direct effect is offset by an intervening positive effect through family income that renders the total effect of maternal working insignificant. No such offsetting effects occur for the white two-parent students; both total and direct effects of maternal working are negative and significant.

Summary and Conclusions

Based on the results of previous research, we have proposed and analyzed a conceptual model of achievement of elementary school students that focuses on the contributions of number of parents and hours worked by the mother in the presence of other control and intervening variables. The literature suggested, and analysis of interactions confirmed, that the variables under study had differential importance for subgroups defined by race and by number of parents. Thus, analyses of number of parents were conducted separately for blacks and whites, and analyses of maternal working were conducted separately for white two-parent, white one-parent, black two-parent, and black one-parent groups.

Analysis of the direct effects of variables for these groups demonstrated that the proposed model is reasonable, and generally consistent with expectations derived from the literature. However, we note that the variables included are most useful in explaining achievement among white two-parent students, and least for black one-parent students. Lack of explanatory power may result from failure to include relevant variables, or from restriction in variability of achievement scores in particular groups brought about by subdividing the sample; both possibilities are suggested by Hetherington et al., (1981).

For both black and white students, living in a house with two parents confers significant advantages in terms of reading and mathematics achievement -- more important for black than for white students. However, in both groups, the major effect of this advantage is mediated by family income directly as well as by the effect of income on subsequent variables in the model, in particular, the number of books in the home. It is clear that the single most salient aspect of one-parent families is their relative lack of financial resources. Referring back to Table 1, we note that within each race, the mean family income for one-parent families is less than half that of two-parent families.

The effects of hours worked by the mother differ markedly by subgroup, again reflecting partly the effects of income. For one-parent black students the total effect of maternal working is positive and significant. As there is an insignificant direct effect of maternal working, it is clear that most of the positive total effect results from the increased income contributed by the working mother. This is particularly true for reading achievement, which appears to be more contingent upon home variables than is mathematics achievement.

For two-parent black students, there is a negative direct effect of maternal work time, but the positive effect through income reduces the total effect to insignificance.

However, for two-parent white students, there is a negative total effect undiminished substantially by increased income, or in fact, by any other variables in the model. Thus, for this group, maternal working has an unmediated direct negative effect on children's achievement.

Therefore, it would appear that for those families at the bottom of the income scale -- single, black parents -- the income earned by the mother's employment more than offsets her loss of time at home, perhaps pulling the family out of poverty and making real contributions to children's achievement. At the highest income levels -- two-parent white families -- the marginal contribution of the mother's income apparently is not sufficient to offset the negative direct effect of her working and thus, of her diminished time at home. Although these two-parent white mothers work on average the least amount of time (see Table 1), they are the most educated group of mothers. It has been noted by Goldberg (1977) that more educated mothers are more effective in acting as teachers of their children. Thus, it is possible that the loss of this more effective teaching time is most detrimental to the children of these mothers.

Other results of interest here are those related to the ways in which children spend their time and the effects of this behavior on achievement. While these

elementary school children spend nearly three times as much time viewing television as they spend on homework, there appears to be no effect, either positive or negative, of such television viewing. As suggested by Hornik (1981), the lack of effects in this study may result from our adequate control for socioeconomic status.

On the other hand, within this study, the greater the amount of time spent doing homework, the lower the achievement. We have suggested that this may be a selection effect; lower-achieving students are given more homework to do. It is also possible that the students within this age range are given equivalent amounts of homework, but that the higher-achieving children can complete it in less time. In either case, it can be suggested that the schools are failing to challenge the better students in the area of outside assignments, as suggested by the report of the Commission on Excellence in Education (1983). The amount of time devoted to homework by students in this study -- just under an hour on a typical weekday -- is not excessive, and could be increased.

Finally, returning to our major findings, we note the lack in this study of longitudinal measures of either the duration of residence in a one-parent family or of mother's work history over the child's lifetime. The

cross-sectional measures we do have may also be capturing some longer-term effects of each phenomenon. If so, the consequences — both the negative ones associated with absence of a parent, and the positive ones associated with single mothers working -- may be more pervasive for black children. Not only are far more of them residing with single mothers, but they are likely to spend far more of their lives in that status. For these children, low family income is a major contributor to low achievement, and the added income contributed by a working mother appears to enhance their achievement significantly.

NOTES

1. LISREL V does provide unweighted least squares estimates, but standard errors of the parameter estimates are not provided.

2. The total effect of number of parents refers to the mean difference in (e.g.) reading achievement for students from two-parent and one-parent households when controlling for race, gender, and mother's educational attainment. The direct effect corresponds to that mean difference when controlling for all variables in the model. Indirect effects refer to the portion of the total effect mean difference mediated by the intervening variables. For purposes of this analysis, we have estimated the direct effects with the values of the variables in the X variable set at average value for singles and duals within race categories, and the values of the Y variables set at the mean for the students who reside in a one-parent household. More details on the calculation of direct effects of partitioning variables, as well as their total and indirect effects is available from the authors.

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APPENDIX A

	Coding of Variables	Mean	SD
RACE	Race; coded as white = 1, black = 0	14.7% black, 85.3% white	
NUMHEAD	Number of parents (adults) in household; coded as 2 parents = 1, one parent = 0	16.1% single, 83.9% dual	
GENDER	Child's gender; coded as female = 1, males = 0	48.7% male 51.3% female	
FAVHRSWK	Average hours worked per week over a year's time by the female; coded as actual average hours per week	12.29	15.21
MED	Mother's educational attainment; coded as years of schooling completed (7, 10, 12, 14, 16, 18)	12.0	2.43
NKIDS	Number of children in family	3.13	1.55
LOGINC	Log (natural) of family income	9.46	.81
EDEXP	Parent's expectations for the child's educational attainment; coded as years of schooling (10, 12, 14, 16, 18)	13.98	2.03
BOOKS	Number of books available in the home at the child's reading level; coded at interval midpoints (0, 5, 15, 25, 35, 45, 55)	28.98	20.41
HELPS	Extent to which parents help child with homework; ordinal scale (0-3, never-often)	1.86	1.01

Appendix A (continued)

	Coding of Variables	Mean	SD
HOMEWORK	Minutes per day child spends doing homework; coded at interval midpoints from 0, 15, 45...255	56.96	45.15
READTIME	Minutes per day child spends reading; coded at midpoints from 0, 15, 45...255	62.70	42.33
TV	Minutes per day child spends watching TV; coded at midpoints from 0, 15, 45...255	152.01	60.91
PTCONF	Number of parent-teacher conferences attended by parent in last year; coded 0-4	1.19	1.08
READACH	Reading achievement vertical scale score (VSS) standardized to mean = 50, SD = 10 within grade	474.96 (in VSS units, across 6 grades)	92.81
MATHACH	Math achievement vertical scale score (VSS) standardized to mean = 50, SD = 10 within grade	471.15 (in VSS units, across 6 grades)	104.61

FIGURE 1

Conceptual Model

			Number of books in home at child's reading level (BOOKS)	
Number of Parents (NUMHEAD)		Number of children in family (NKIDS)	Number of parent-teacher conferences (PTCONF)	
			Parents assist child with homework (HELPS)	
Race, Black or White (RACE)	Average hours worked by mother (FAVHRSWK)	Log of family income (LOGINC)		Reading Achievement (READACH)
			Time child spends reading (READTIME)	Mathematics Achievement (MATHACH)
Mother's educational attainment (MED)			Time child spends doing homework (HOMEWORK)	
		Parental educational expectations for child (EDEXP)		
Gender (GENDER)			Time child spends watching television (TV)	

TABLE 1

Means of Study Variables by Race and Number of Parents

	Race			
	White		Black	
Variable	One Parent	Two Parents	One Parent	Two Parents
MED	11.88 (2.40)	12.19 (2.39)	10.76 (2.28)	11.26 (2.50)
GENDER (females = 1)a/	47.5	48.6	52.3	47.0
FAVHRSWK	20.14 (17.28)	10.84 (14.39)	13.77 (16.16)	15.99 (16.03)
NKIDS	2.95 (1.54)	3.01 (1.39)	3.97 (2.10)	3.80 (1.99)
INCOME	8342.25 (5454.84)	18439.60 (10704.20)	5422.09 (3811.92)	13073.40 (7706.42)
EDEXP	13.75 (1.97)	14.07 (2.02)	13.35 (1.94)	13.94 (2.09)
BOOKS	27.29 (20.28)	32.00 (19.90)	11.50 (13.76)	16.48 (17.44)
HELPSb/	28.3	31.6	47.0	48.3
PTCONF	1.07 (1.02)	1.21 (1.05)	1.11 (1.28)	1.11 (1.29)
HOMEWORK	51.74 (43.81)	52.34 (42.64)	84.47 (48.43)	84.37 (49.13)
TV	155.43 (62.17)	150.06 (60.12)	164.45 (64.27)	156.49 (62.52)
READTIME	61.06 (43.47)	61.24 (40.91)	71.96 (49.26)	70.90 (46.08)
READACH	49.71 (9.71)	51.52 (9.55)	40.81 (8.49)	43.41 (8.89)
MATHACH	49.70 (9.63)	51.34 (9.65)	41.96 (8.90)	44.20 (9.35)
Sample Size	1,125	9,036	798	960

a/ Percent of item.
b/ Percent of parents who often help with homework.

Item Identification

MED	Mother's educational attainment
GENDER	Student's gender
FAVHRSWK	Average hours per week worked by female parent
NKIDS	Number of siblings
INCOME	Total family income
EDEXP	Parental educational attainment expectations for their child
BOOKS	Number of books available in the home at child's reading level
HELPS	Extent to which parents help with homework
PTCONF	Number of parent - teacher conferences attended
HOMEWORK	Average number of minutes per day child spends doing homework
TV	Average number of minutes per day child spends watching television
READTIME	Average number of minutes per day child spends reading
READACH	Standardized reading achievement score
MATHACH	Standardized math achievement score
RACE	Student's Race
NUMHEAD	Number of parents in household

TABLE 2

Parameter Estimates of Direct Effects of Exogenous and Endogenous Variables by Race and Number of Parents
(Standard Errors in Parentheses)

Dependent Variables		Independent Variables													
		MED	FAVHRSWK	GENDER	NKIDS	LOGINC	EDEXP	BOOKS	HELPS	PTCONF	HOMEWORK	TV	READTIME	CONSTANT	R^2
FAVHRSWK	DW[a/]	.4926** (.0631)												4.8336 (0.4926)	.0067
	SW	1.9960** (.2061)												-3.5653 (1.9960)	.0771
	DB	1.7588** (1.990)												-3.8144 (1.7588)	.0754
	SB	1.7620** (.2435)												-5.1897 (2.6788)	.0617
NKIDS	DW	-0.0718** (0.0061)	-0.0108** (0.0010)											3.9978 (0.0752)	0.0298
	SW	-0.1377** (0.0193)	-0.0071** (0.0027)											4.7277 (0.2254)	0.0616
	DB	-0.1477** (0.0253)	-0.0276** (0.0039)											5.9066 (0.2810)	0.1064
	SB	-0.1807** (0.0324)	-0.0196** (0.0046)											6.1798 (0.3456)	0.0762
LOGINC	DW	0.0896** (0.0028)	0.0061** (0.0005)											8.4973 (0.0353)	0.1201
	SW	0.0668** (0.0087)	0.0148** (0.0012)											7.7177 (0.1008)	0.2026
	DB	0.0966** (0.0074)	0.0126** (0.0012)											8.0027 (0.0818)	0.2950
	SB	0.0613** (0.0123)	0.0221** (0.0017)											7.3484 (0.1311)	0.2280

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Table 2 (continued)

Dependent Variables		Independent Variables												
		MED	FAVHRSWK	GENDER	NKIDS	LOGINC	EDEXP	BOOKS	HELPS	PTCONF	HOMEWORK	TV	READTIME	CONSTANT	R^2
EDEXP	DW	0.3569**	-0.0017	-0.1383**										9.6628	0.1783
		(0.0081)	(0.0013)	(0.0386)										(0.1024)	
	SW	0.3602**	0.0070*	-0.0304										9.3170	0.2119
		(0.0226)	(0.0031)	(0.1047)										(0.2692)	
	DB	0.3345**	0.0031	-0.0224										10.1098	0.1656
		(0.0257)	(0.0040)	(0.1246)										(0.2935)	
	SB	0.2719**	0.0032	0.2188										10.4876	0.1090
		(0.0295)	(0.0042)	(0.1306)										(0.3198)	
BOOKS	DW	1.4198**	0.0014	2.5810**	-0.1405	2.5671**	1.6512**							-31.5998	0.1109
		(0.0943)	(0.0140)	(0.3955)	(0.1449)	(0.3090)	(0.1092)							(2.9782)	
	SW	1.4583**	0.0465	1.6262	-0.2933	0.4944	2.0098**							-21.2327	0.1174
		(0.2805)	(0.0370)	(1.1428)	(0.3921)	(0.8815)	(0.3334)							(7.5321)	
	DB	0.8499**	0.0087	2.2370*	-0.3082	4.1568**	1.9051**							-56.0530	0.1658
		(0.2480)	(0.0365)	(1.0417)	(0.2779)	(0.9515)	(0.2757)							(8.2818)	
	SB	1.1570**	-0.0409	0.8419	0.2048	1.7300**	1.0542**							-29.2636	0.0973
		(0.2273)	(0.0335)	(0.9355)	(0.2365)	(0.6269)	(0.2579)							(5.4936)	
HELPS	DW	0.0189**	-0.0018*	-0.0419*	-0.0625**	0.0101	-0.0255**							2.0378	0.0102
		(0.0051)	(0.0008)	(0.0212)	(0.0078)	(0.0166)	(0.0059)							(0.1596)	
	SW	0.0083	-0.0000	-0.0835	-0.0434*	0.0070	0.0010							1.6260	0.0071
		(0.0149)	(0.0020)	(0.0609)	(0.0209)	(0.0470)	(0.0178)							(0.4013)	
	DB	0.0312*	-0.0026	-0.0752	-0.0351*	0.0326	0.0064							1.5515	0.0179
		(0.0150)	(0.0022)	(0.0629)	(0.0168)	(0.0574)	(0.0166)							(0.4999)	
	SB	0.0286	0.0013	-0.0705	-0.0097	-0.0968*	0.0092							2.4375	0.0113
		(0.0172)	(0.0025)	(0.0707)	(0.0179)	(0.0474)	(0.0195)							(0.4152)	

Table 2 (continued)

Dependent Variables		Independent Variables												
		MED	FAVHRSWK	GENDER	NKIDS	LOGINC	EDEXP	BOOKS	HELPS	PTCONF	HOMEWORK	TV	READTIME	CONSTANT	R^2
PTCONF	DW	0.0581**	-0.0035**	-0.1284**	-0.0400**	0.0384*	0.0116							0.0650	0.0328
		(0.0052)	(0.0008)	(0.0217)	(0.0080)	(0.0170)	(0.0060)							(0.1636)	
	SW	0.0741**	-0.0041*	-0.2407**	-0.0484*	0.0431	-0.0081							0.0187	0.0517
		(0.0146)	(0.0019)	(0.0595)	(0.0204)	(0.0459)	(0.0174)							(0.3921)	
	DB	0.1001**	-0.0024	-0.2129**	-0.0590**	0.0053	0.0876**							-1.1423	0.1070
		(0.0190)	(0.0028)	(0.0798)	(0.0213)	(0.0729)	(0.0211)							(0.6341)	
	SB	0.0654**	-0.0111**	-0.1951*	-0.0416	0.0973	0.0775**							-1.2118	0.0589
		(0.0216)	(0.0032)	(0.0889)	(0.0225)	(0.0595)	(0.0245)							(0.5218)	
HOMEWORK	DW	-1.7302**	0.0806*	6.6316**	-0.6665*	-0.4634	-0.3955							88.0191	0.0182
		(0.2123)	(0.0315)	(0.8905)	(0.3262)	(0.6958)	(0.2459)							(6.7055)	
	SW	-1.9502**	-0.0007	10.3786**	0.4372	-0.6779	1.0506							70.6042	0.0243
		(0.6369)	(0.0839)	(2.5950)	(0.8903)	(2.0018)	(0.7571)							(17.1040)	
	DB	-2.0942**	0.0708	11.0219**	-0.1495	-5.0851	4.4035**							99.0982	0.0458
		(0.7471)	(0.1100)	(3.1386)	(0.8373)	(2.8669)	(0.8306)							(24.9540)	
	SB	1.4470	0.0828	6.2136	2.4894**	-5.2477*	1.4522							85.0862	0.0226
		(0.8325)	(0.1227)	(3.4263)	(0.8663)	(2.2958)	(0.9445)							(20.1194)	
TV	DW	-3.2106**	0.1976**	-5.3490**	-2.6228**	1.6160	-1.7715**							201.5186	0.0291
		(0.2977)	(0.0442)	(1.2485)	(0.4574)	(0.9755)	(0.3448)							(9.4015)	
	SW	-3.1419**	-0.0013	-0.9320	-1.3886	5.7484*	-3.1454**							188.9845	0.0290
		(0.9017)	(0.1188)	(3.6742)	(1.2605)	(2.8343)	(1.0720)							(24.2174)	
	DB	-0.2553	0.2034	5.9365	2.5143*	0.0077	-0.3681							154.7601	0.0099
		(0.9683)	(0.1426)	(4.0679)	(1.0852)	(3.7157)	(1.0765)							(32.3423)	
	SB	2.8476**	0.2902	-10.5243*	2.2232	-7.4678*	-2.3561							209.5110	0.0281
		(1.1016)	(0.1623)	(4.5334)	(1.1462)	(3.0377)	(1.2496)							(26.6207)	

Table 2 (continued)

Dependent Variables		Independent Variables												
		MED	FAVHRSWK	GENDER	NKIDS	LOGINC	EDEXP	BOOKS	HELPS	PTCONF	HOMEWORK	TV	READTIME	CONSTANT	R^2
READTIME	DW	-0.6925**	-0.0201	9.5807**	-1.1075**	0.1272	2.3966**							43.2173	0.0270
		(0.2028)	(0.0301)	(0.8505)	(0.3116)	(0.6646)	(0.2349)							(6.4046)	
	SW	0.3054	0.0202	10.1447**	-0.2137	-3.6529	2.8557**							55.9011	0.0320
		(0.6294)	(0.0830)	(2.5648)	(0.8799)	(1.9785)	(0.7483)							(16.9049)	
	DB	-0.1519	0.0342	12.8449**	0.3345	-3.7804	5.1046**							41.5729	0.0671
		(0.6929)	(0.1020)	(2.9108)	(0.7765)	(2.6588)	(0.7703)							(23.1427)	
	SB	1.8101*	0.0619	5.0513	2.5978**	-4.1600	2.2535*							48.2229	0.0260
		(0.8453)	(0.1246)	(3.4786)	(0.8795)	(2.3309)	(0.9589)							(20.4268)	
READACH	DW	0.7192**	-0.0460**	1.7544**	-0.6159**	0.8953**	0.9439**	0.1021**	-1.0788**	-0.6647**	-0.0178**	-0.0025	0.0316**	22.9602	0.3101
		(0.0412)	(0.0059)	(0.1693)	(0.0617)	(0.1312)	(0.0470)	(0.0045)	(0.0897)	(0.0818)	(0.0023)	(0.0014)	(0.0021)	(1.3184)	
	SW	0.8059**	-0.0262	1.3221**	-0.2730	0.9956**	0.7100**	0.1174**	-0.5798*	-0.6142*	-0.0188**	-0.0053	0.0315**	21.9512	0.2803
		(0.1254)	(0.0161)	(0.5063)	(0.1709)	(0.3838)	(0.1479)	(0.0132)	(0.2622)	(0.2523)	(0.0062)	(0.0041)	(0.0059)	(3.4137)	
	DB	0.2795*	-0.0403*	2.2391**	-0.4586**	2.7535**	0.4377**	0.1238**	-0.4023	-0.3522	-0.0135*	-0.0003	0.0192**	11.1927	0.2542
		(0.1236)	(0.0177)	(0.5135)	(0.1356)	(0.4670)	(0.1404)	(0.0161)	(0.2723)	(0.2077)	(0.0056)	(0.0040)	(0.0059)	(4.2094)	
	SB	0.2149	0.0124	2.0953**	-0.4763**	1.1817**	0.7626**	0.0800**	-0.7143*	0.1543	0.0065	0.0038	0.0084	19.8224	0.1668
		(0.1392)	(0.0202)	(0.5627)	(0.1425)	(0.3799)	(0.1569)	(0.0215)	(0.2888)	(0.2239)	(0.0061)	(0.0044)	(0.0059)	(3.5894)	
MATHACH	DW	0.6110**	-0.0416**	1.3636**	-0.1323*	0.8861**	1.0294**	0.0745**	-1.2335**	-0.7952**	-0.0105**	0.0015	0.0152**	22.6201	0.2179
		(0.0443)	(0.0064)	(0.1822)	(0.0664)	(0.1412)	(0.0506)	(0.0049)	(0.0965)	(0.0880)	(0.0023)	(0.0015)	(0.0023)	(1.4187)	
	SW	0.3818**	-0.0276	1.5242**	0.0003	1.2851**	0.8743**	0.0988**	-0.1327	-0.9734**	-0.0004	0.0007	0.0158*	20.6908	0.1777
		(0.1330)	(0.0170)	(0.5368)	(0.1812)	(0.4070)	(0.1568)	(0.0140)	(0.2780)	(0.2675)	(0.0066)	(0.0043)	(0.0063)	(3.6194)	
	DB	0.2934*	-0.0587**	1.3083*	-0.2400	2.1881**	0.5315**	0.0662**	-0.8382**	-0.7424**	0.0008	-0.0029	0.0171*	16.4254	0.1368
		(0.1399)	(0.0200)	(0.5815)	(0.1535)	(0.5288)	(0.1590)	(0.0183)	(0.3084)	(0.2352)	(0.0063)	(0.0045)	(0.0067)	4.7667	
	SB	0.1660	0.0426	0.5524	-0.2792	0.4947	0.4567**	0.0745**	-1.2098**	0.1022	0.0115	0.0051	0.0052	30.0942	0.0945
		(0.1522)	(0.0220)	(0.6151)	(0.1558)	(0.4153)	(0.1716)	(0.0235)	(0.3157)	(0.2448)	(0.0067)	(0.0048)	(0.0065)	(3.9242)	

a/ Subgroups are as follows: DW=dual-parent white families; SW=single-parent white families; DB=dual-parent black families; SB=single-parent black families.

* Indicates significance at p .05.
** Indicates significance at p .01.

TABLE 3

Total, Direct and Indirect[a] Effects on Reading and Mathematics Achievement of Number of Parents (by Race) and of Average Number of Hours Worked by Mothers (by Race and Number of Parents)

Exogenous Variables	Total Effect	Direct Effect	Indirect Effects Via Intervening Variables									Outcome Variables
			FAVHRSWK	NKIDS	LOGINC	EDEXP	BOOKS	HELPS	PTCONF	HOMEWORK	TV	READTIME	
WHITES													
Number of Parents	1.33**	-.18	.32	.01	.99	.23	.16	-.10	-.09	-.04	.01	-.03	READACH
	1.28**	-.09	.32	.00	.92	.23	.11	-.11	-.05	-.03	.00	-.01	MATHACH
Maternal Work													
Two-parent	-.03**	-.05**	- -	.01	.01	.00	.00	.00	.00	.00	.00	.00	READACH
	-.03**	-.04**	- -	.00	.01	.00	.00	.00	.00	.00	.00	.00	MATHACH
One-parent	.00	-.03	- -	.00	.01	.01	.01	.00	.00	.00	.00	.00	READACH
	.01	-.03	- -	.00	.02	.01	.00	.00	.00	.00	.00	.00	MATHACH
BLACKS													
Number of Parents	2.28**	-.92	.02	.01	2.96	.29	-.08	-.01	.04	-.04	.00	-.01	READACH
	2.02**	-.45	-.02	.00	2.15	.29	-.05	-.02	.09	.00	.03	-.01	MATHACH
Maternal Work													
Two-parent	.02	-.04*	- -	.01	.04	.00	.00	.00	.00	.00	.00	.00	READACH
	-.02	-.06**	- -	.01	.03	.00	.00	.00	.00	.00	.00	.00	MATHACH
One-parent	.05**	.01	- -	.01	.03	.00	.00	.00	.00	.00	.00	.00	READACH
	.06**	.04	- -	.00	.01	.00	.00	.00	.00	.00	.00	.00	MATHACH

[a] Statistical tests of significance were not conducted for indirect effects.

* Indicates significance at p .05.
** Indicates significance at p .01.